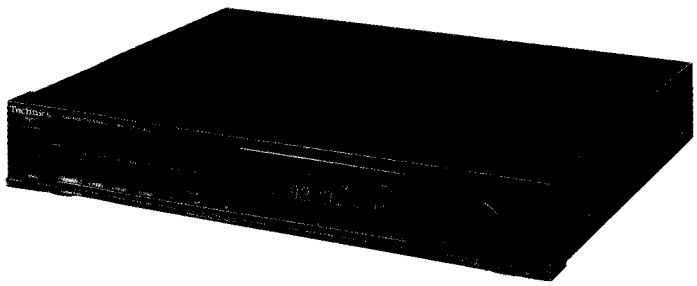
ORDER NO. AD9002029C8

Service Manual

Tuner

LW/MW/FM STEREO TUNER

ST-X301L



Color

(K)	Black Type

Area

Country Code	Area	Color
(E)	Continental Europe	(K)
(EB)	Great Britain	
(GC)	Asia, Latin America, Middle Near East and Africa	
(GN)	Oceania	

SPECIFICATIONS
(DIN 45 500)

■ FM TUNER SECTION

Frequency range	87.50~108.00 MHz (0.05 MHz steps)
Sensitivity	1.5 μV (IHF, usable)
S/N 30 dB	1.3 μV (75 Ω)
S/N 26 dB	1.2 μV (75 Ω)
S/N 20 dB	0.9 μV (75 Ω)
IHF 46 dB stereo quieting sensitivity	28 μV/75 Ω
Total harmonic distortion	
MONO	0.15 %
STEREO	0.3 %
S/N	
MONO	70 dB (78 dB, IHF)
STEREO	65 dB (70 dB, IHF)
Frequency response	20 Hz~15 kHz, +0.5 dB~−1.5 dB
Alternate channel selectivity	
±400 kHz	55 dB
Capture ratio	1.0 dB
Image rejection at 98 MHz	45 dB
IF rejection at 98 MHz	90 dB
Spurious response rejection at 98 MHz	75 dB
AM suppression	55 dB
Stereo separation	
1 kHz	40 dB
10 kHz	30 dB
Carrier leak	
19 kHz	−30 dB (−35 dB, IHF)
38 kHz	−45 dB (−50 dB, IHF)
Channel balance (250 Hz~6,300 Hz)	±1.5 dB
Limiting point	1.2 μV
Bandwidth	
IF amplifier	180 kHz
FM demodulator	1000 kHz
Antenna terminals	75 Ω (unbalanced)

■ AM TUNER SECTION

Frequency range	
MW	522 kHz~1611 kHz (9-kHz steps)
	530 kHz~1620 kHz (10-kHz steps)
LW	155 kHz~353 kHz (9-kHz steps)
	153 kHz~351 kHz (−2-kHz shift)
Sensitivity (S/N 20 dB)	
MW	20 μV, 300 μV/m
LW	50 μV
Selectivity (±9 kHz)	
MW (at 999 kHz)	50 dB
LW (at 254 kHz)	50 dB
Image rejection	
MW (at 999 kHz)	40 dB
LW (at 254 kHz)	40 dB
IF rejection	
MW (at 999 kHz)	60 dB
LW (at 254 kHz)	60 dB

■ TIMER SECTION

Clock	Quartz-lock type 24-hour indication
Functions	24-hour programmable; weekly (1 setting) once only (1 setting) sleep (at 10~60 min., 10-min. intervals)
Programmable content	Program source (FM, MW, LW, CD, TAPE) Timer rec/timer play/power ON/OFF setting Designation of preset station
Setting intervals	1 minute~23-hours, 59 minutes (at 1-min. intervals)
Priority order	sleep, once, weekly

■ GENERAL

Output voltage	0.3 V (0.6V IHF)
Power consumption	9 W (Stand by 5 W)
Power supply	
For Continental Europe	AC 50 Hz/60 Hz, 220 V
For Great Britain and Oceania	AC 50 Hz/60 Hz, 240 V
For others	AC 50 Hz/60 Hz, 110 V/120 V/220 V/240 V
Dimensions (W × H × D)	360 × 64.5 × 288 mm (14-3/16" × 2-17/32" × 11-11/32")
Weight	2.1 kg (4.6 lb.)

Note:
Specifications are subject to change without notice. Weight and dimensions are approximate.

Technics

Matsushita Electric Industrial Co., Ltd.
Central P.O. Box 288, Osaka 530-91, Japan

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■ ACCESSORIES

	Page
•Stereo connection cable (SJPK2203-2)	1

•FM indoor antenna
For (GC) (GN) areas only (SSA272M)
For (E) (EB) areas (SSA270M)
	1

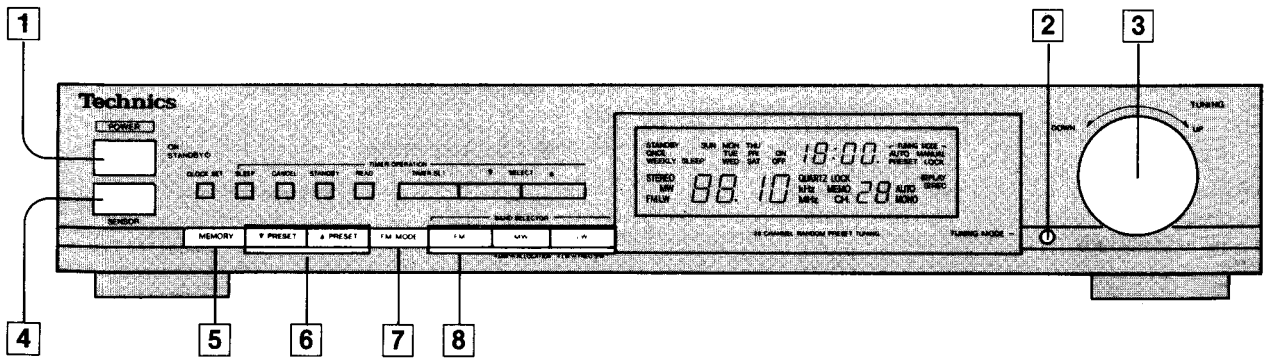
•AM loop antenna (SPB1162T)	1
•AM antenna holders (SMA233-1M)	1
(SMA231M)	1
•Screws (XTB3+10AFZ)	2
•3-core flat cable (SWKTX930E)	1
•AC plug adaptor (RJP9215) for (GC) area only	1

•AC power supply cord
For (GN) area only (SJA173)
For (GC) area only (RJA0004)
For (E) only (SFDAC05E03)
For (EB) area only (SJA193)
	1

•Remote-control transmitter (RAK-SC301X)	1
•Attachment plug (SJP9009) for (EB) area only	1
•Batteries (R03)	2

■ LOCATION OF CONTROLS

The indication AM used here includes both MW and LW.



Tuner section

1 Power "STANDBY ⏻ /ON" switch (POWER/ON/STANDBY ⏻)

2 Tuning-mode selector (TUNING MODE)

3 Tuning control (TUNING)

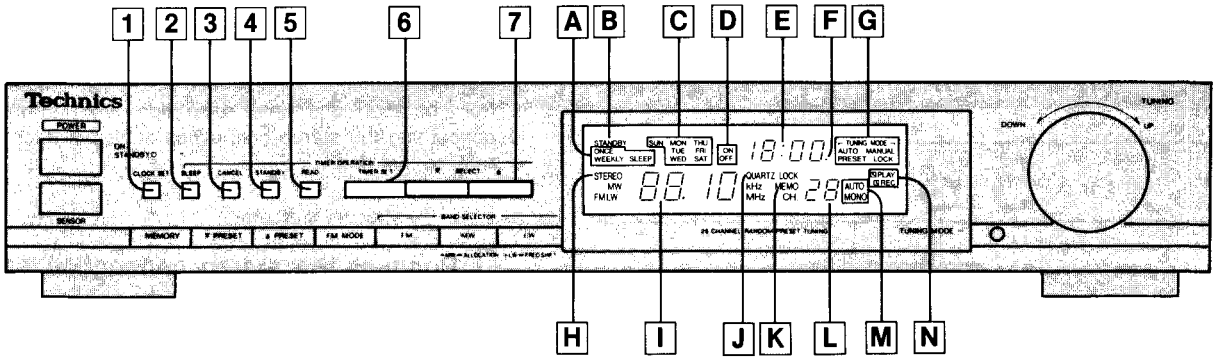
4 Remote-control signal receptor (SENSOR)

5 Memory button (MEMORY)

6 Preset-channel buttons (▼ PRESET/▲ PRESET)

7 FM mode selector (FM MODE)

8 Band selectors (BAND SELECTOR)



Timer section

1 Clock set button (CLOCK SET)

2 Sleep button (SLEEP)

3 Cancel button (CANCEL)

4 Stand-by button (STANDBY)

5 Read button (READ)

6 Set button (TIMER SET)

7 Select buttons (SELECT)

Display section

A Timer-mode indicator (ONCE/WEEKLY/SLEEP)

B Stand-by indicator (STANDBY)

C Day display

D Timer ON/OFF indicator (ON/OFF)

E Time display

F Colon indicator

G Tuning-mode indicator (AUTO/MANUAL/PRESET/LOCK)

H FM stereo indicator (STEREO)

I Digital frequency display

J Quartz-lock indicator (QUARTZ LOCK)

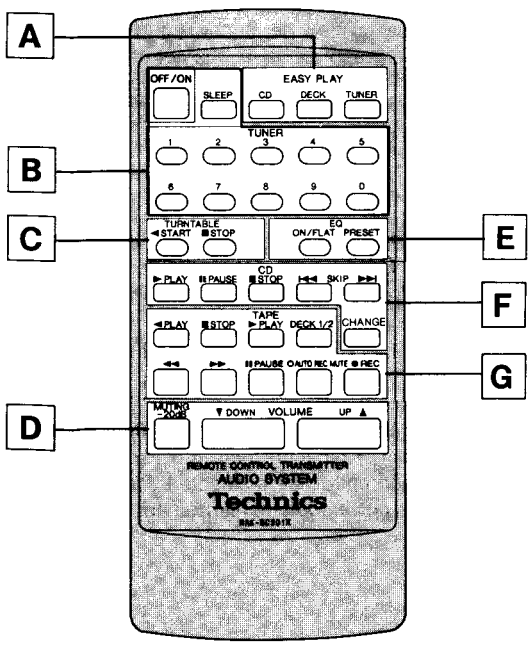
K Memory indicator (MEMO)

L Channel display

M FM mode indicator (AUTO/MONO)

N Timer play/rec indicator (L PLAY/REC)

•REMOTE CONTROL TRANSMITTER



A Easy play keys

B Tuner keys

C Turntable keys

D Amplifier keys

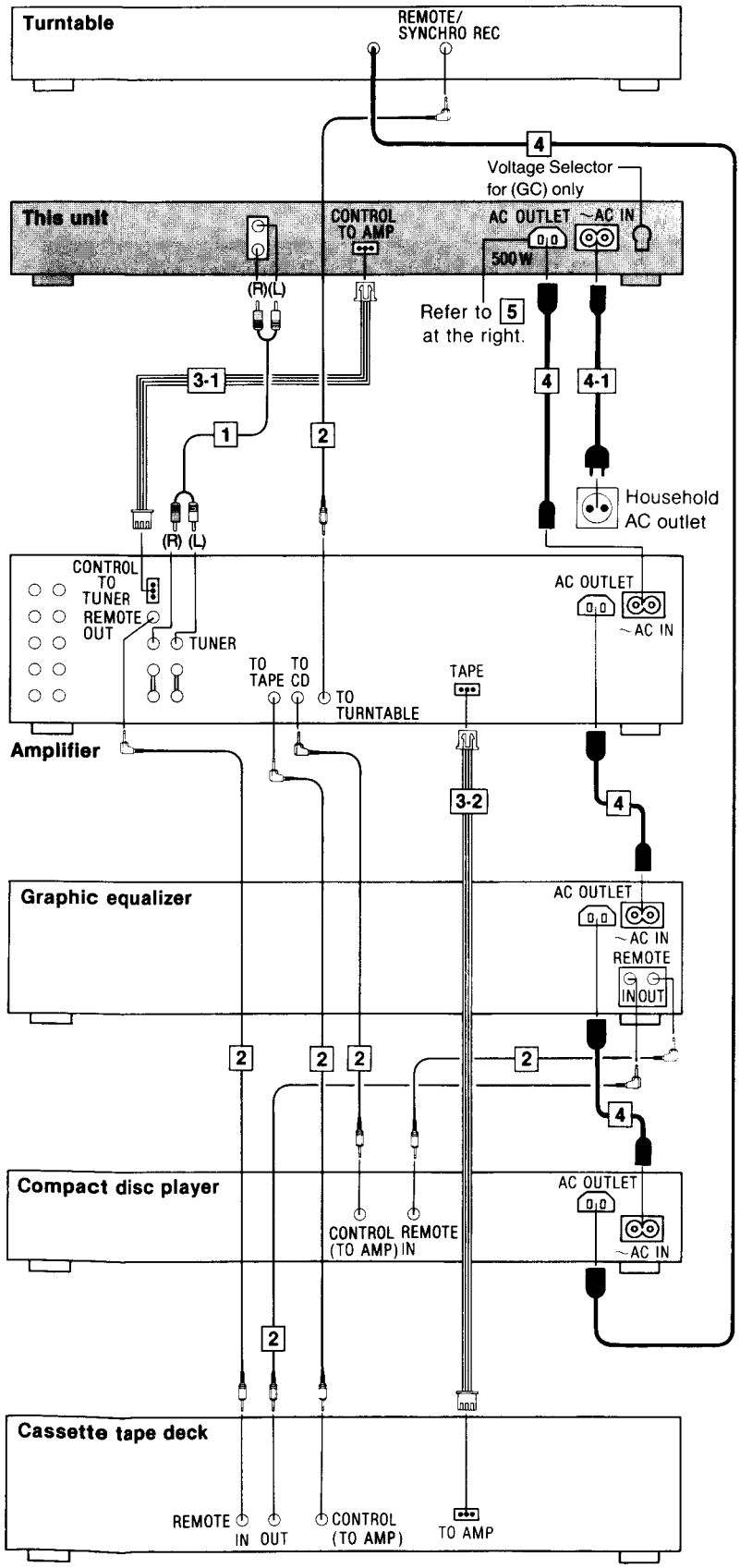
E Graphic equalizer controls

F Compact disc player keys

G Cassette tape deck keys

■ CONNECTIONS

Make connections in the numbered sequence by using the included cables and power cord.



Make connections as described below for remote-control operation and timer operation. For information concerning the stereo connection cables of each unit, refer to that unit.

1 Connect the stereo connection cable (included).

2 Connect the L-type cables.

3 Connect the 3-core flat cables.

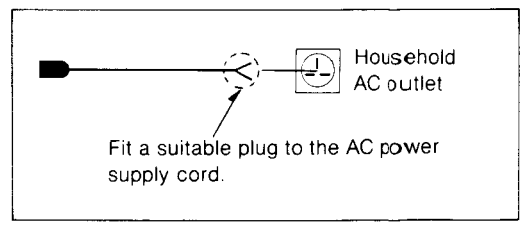
3-1 Connect the 3-core flat cable (included).

3-2 Connect the 3-core flat cable (included with the cassette deck).

4 Connect the AC power supply cords.

4-1 Connect the AC power supply cord (included).

1 Connect this cord only after all other cables have been connected.
2 For United Kingdom



Notes:
- Configuration of the AC outlets and AC power supply cords differ according to area.
- If the graphic equalizer is not used in combination with these components, connect the AC power supply cord of the compact disc player to the AC outlet of the amplifier.

5 "AC OUTLET"

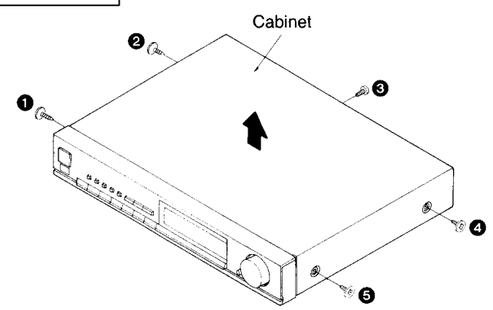
"SWITCHED" outlet

Power is controlled by the power switch.
This outlet is only for use with other audio equipment.

Note:
If another unit is connected to the AC outlet of this unit, be sure to check that the total amount of power consumption of each unit to be connected does not exceed the maximum power output allowed for the AC outlet of this unit.

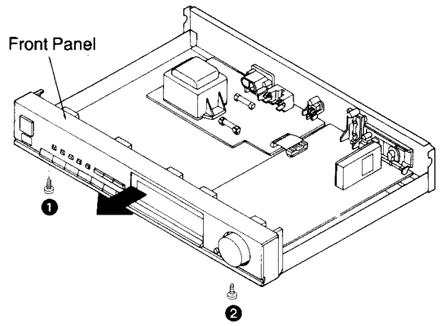
■ DISASSEMBLY INSTRUCTIONS

Ref. No. 1	Removal of the cabinet
Procedure 1	



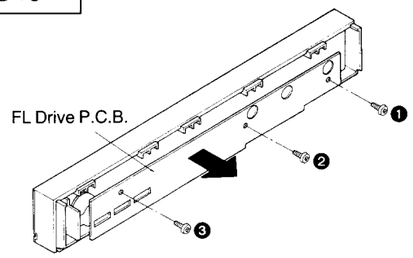
•Remove the 5 screws (❶~❺).

Ref. No. 2	Removal of the front panel
Procedure 1→2	



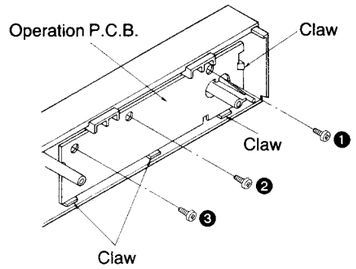
1. Remove the 2 screws (❶, ❷).
2. Remove the front panel in the direction of the arrow.

Ref. No. 3	Removal of the FL drive P.C.B.
Procedure 1→2→3	



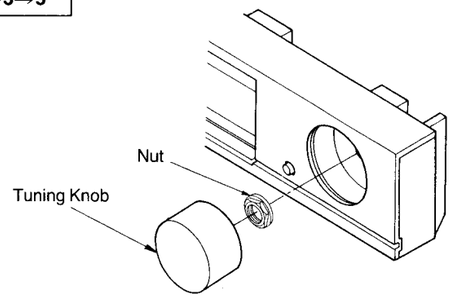
1. Remove the 3 screws (❶~❸).

Ref. No. 4	Removal of the operation P.C.B.
Procedure 1→2→3→4	

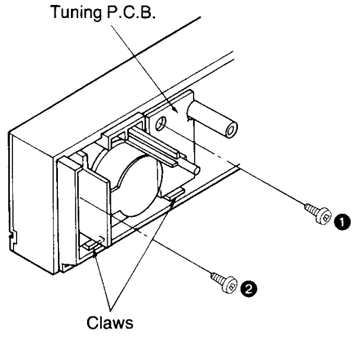


1. Remove the 3 screws (❶~❸).
2. Release the 4 claws.

Ref. No. 5	Removal of the tuning P.C.B.
Procedure 1→2→3→5	



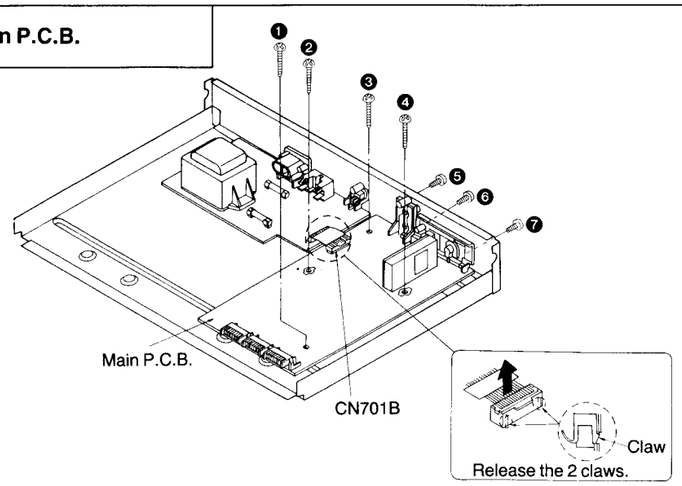
1. Pull out the tuning knob.
2. Remove the nut.



3. Remove the 2 screws (❶, ❷).
4. Release the 2 claws.

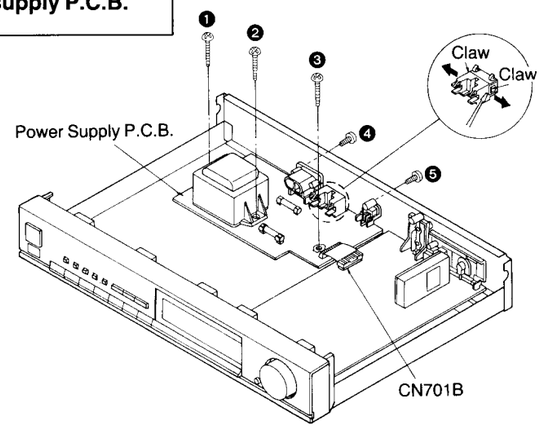
Ref. No. 6	Removal of the main P.C.B.
Procedure 1→2→6	

1. Remove the 7 screws (❶~❼).
2. Remove the connection (CN701B).



Ref. No. 7	Removal of the power supply P.C.B.
Procedure 1→7	

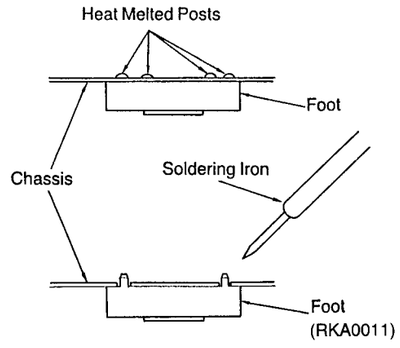
1. Remove the 5 screws (❶~❺).
2. Remove the connector (CN701B).
3. Remove the 2 claws of AC outlet.



"ATTENTION SERVICER"
Some chassis components may have sharp edges. Be careful when disassembling and servicing.

•Replacement of the Foot.

1. Remove the 4 heat melted posts on the chassis with a pair of nippers or similar tool.
2. To replace the foot (RKA0011) on the chassis, melt the 4 posts with a soldering iron.



■ MEASUREMENTS AND ADJUSTMENTS

FM ADJUSTMENT

Control positions and equipment used

- FM signal generator(FM-SG)
- Stereo modulator
- Distortion analyser
- DC electronic voltmeter(EVM)
- Frequency counter
- Choke coil(100μH)
- Resistor(100kΩ)

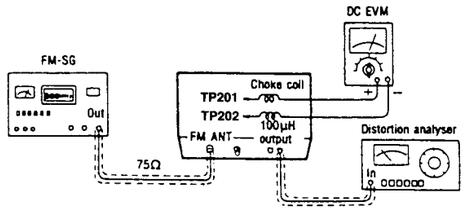
Note: For Z251 (AM-ANT/OSC) and Z202 (AM-IFT), they are supplied as adjusted parts. So, do not turn the cores of the parts. It is not necessary to adjust the AM circuit.

FM MONO DISTORTION ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the unit to **"FM"** mode.
3. Set the radio frequency display and signal generator to **100.10MHz**.
4. Adjust the core of **T201** so that the voltage measured in signal mode is **0mV(0±20mV)** in 300mV range.
5. Adjust **T202** so that the distortion factor of L-CH and R-CH is minimized.
6. Repeat steps 4 and 5.

Note: The adjusting screwdriver used should be made of resin.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 1kHz
Output level.....66dB



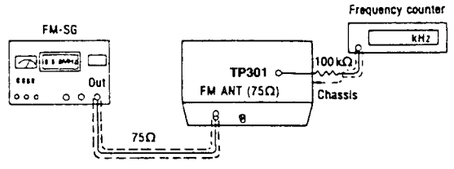
MPX VCO ADJUSTMENT

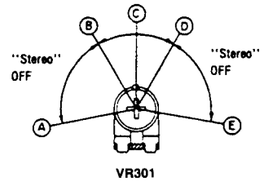
1. Test equipment connection is shown in figure.
2. Set the unit to **"on/auto"** position.
3. Set the radio frequency display and signal genarator to **100.10MHz**.
4. Adjust **VR301** for **19kHz±30Hz** on frequency counter reading.

USING ALTERNATE SYSTEM

1. Receive the stereo broadcast.
2. Adjust **VR301** until stereo indicator lights up. Fix the arm of **VR301** as shown in figure.

FM SIGNAL GENERATOR CONDITION
Modulation 100%
Modulation frequency 0kHz
Output level.....66dB

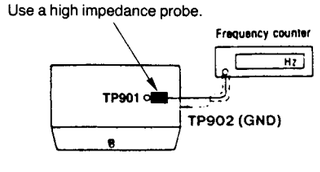




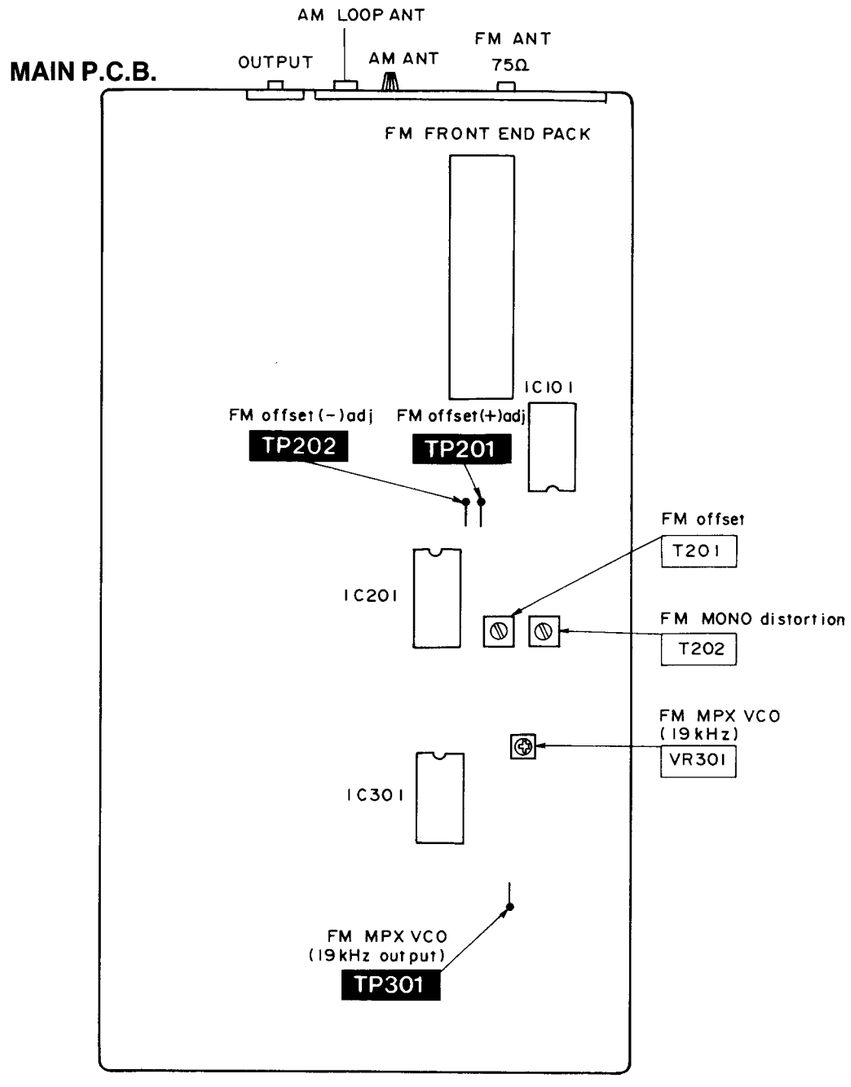
Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... "Stereo" OFF position
Ⓑ–Ⓓ..... "Stereo" ON position (Indicator lighting)
Ⓒ..... Adjust point of pilot circuit

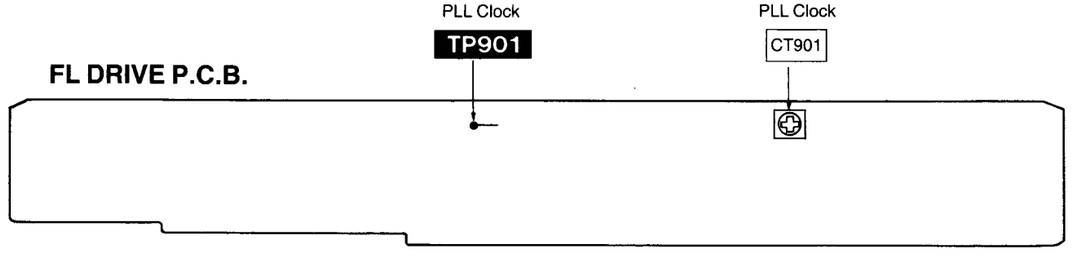
PLL CLOCK FREQUENCY ADJUSTMENT

1. Test equipment connection is shown in figure.
2. Set the Power Switch to "OFF". (The indication "E" in the display will blink.)
3. Adjust **CT901** for **2,097,152 Hz±10 Hz** on frequency counter reading.

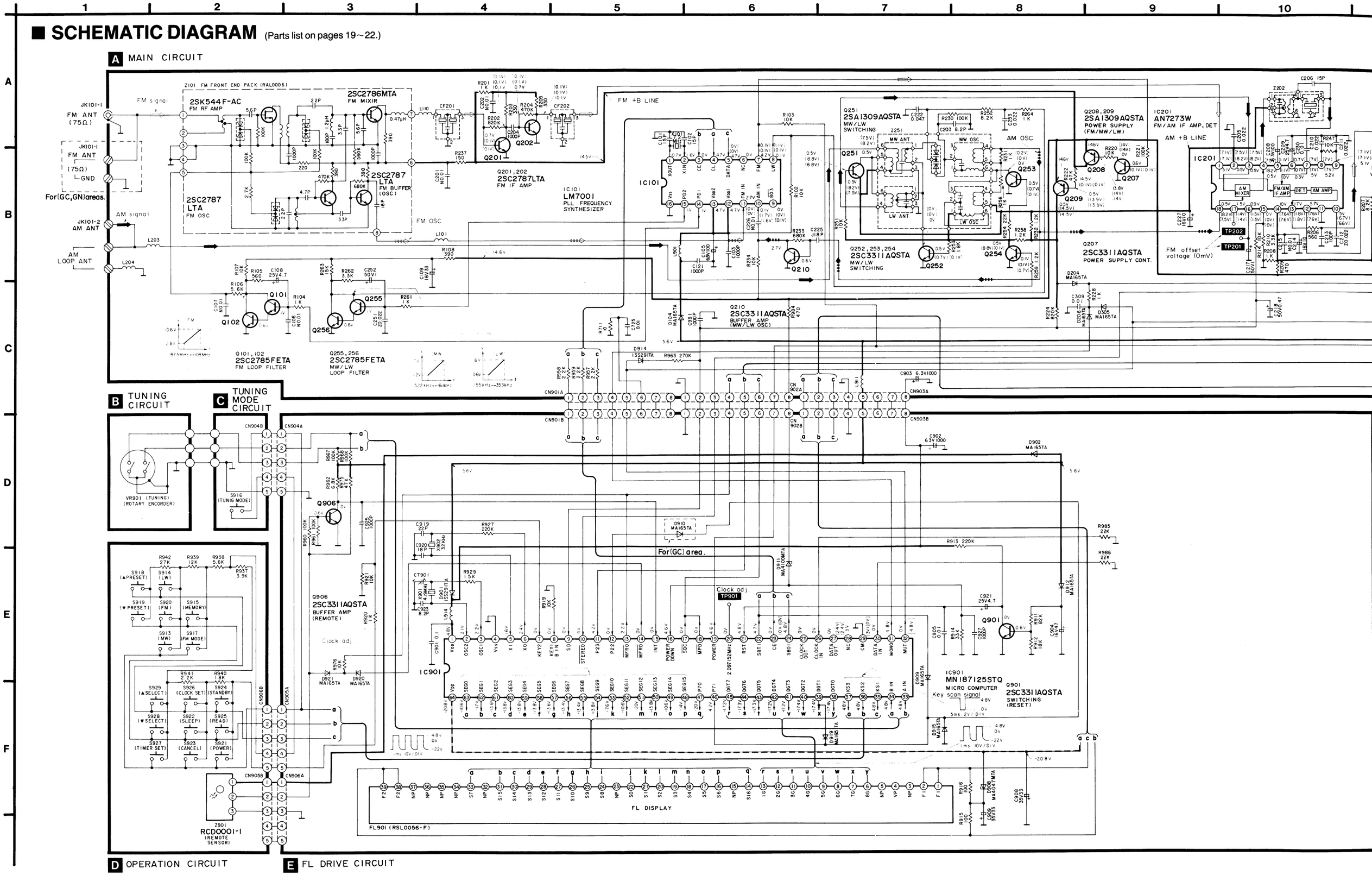


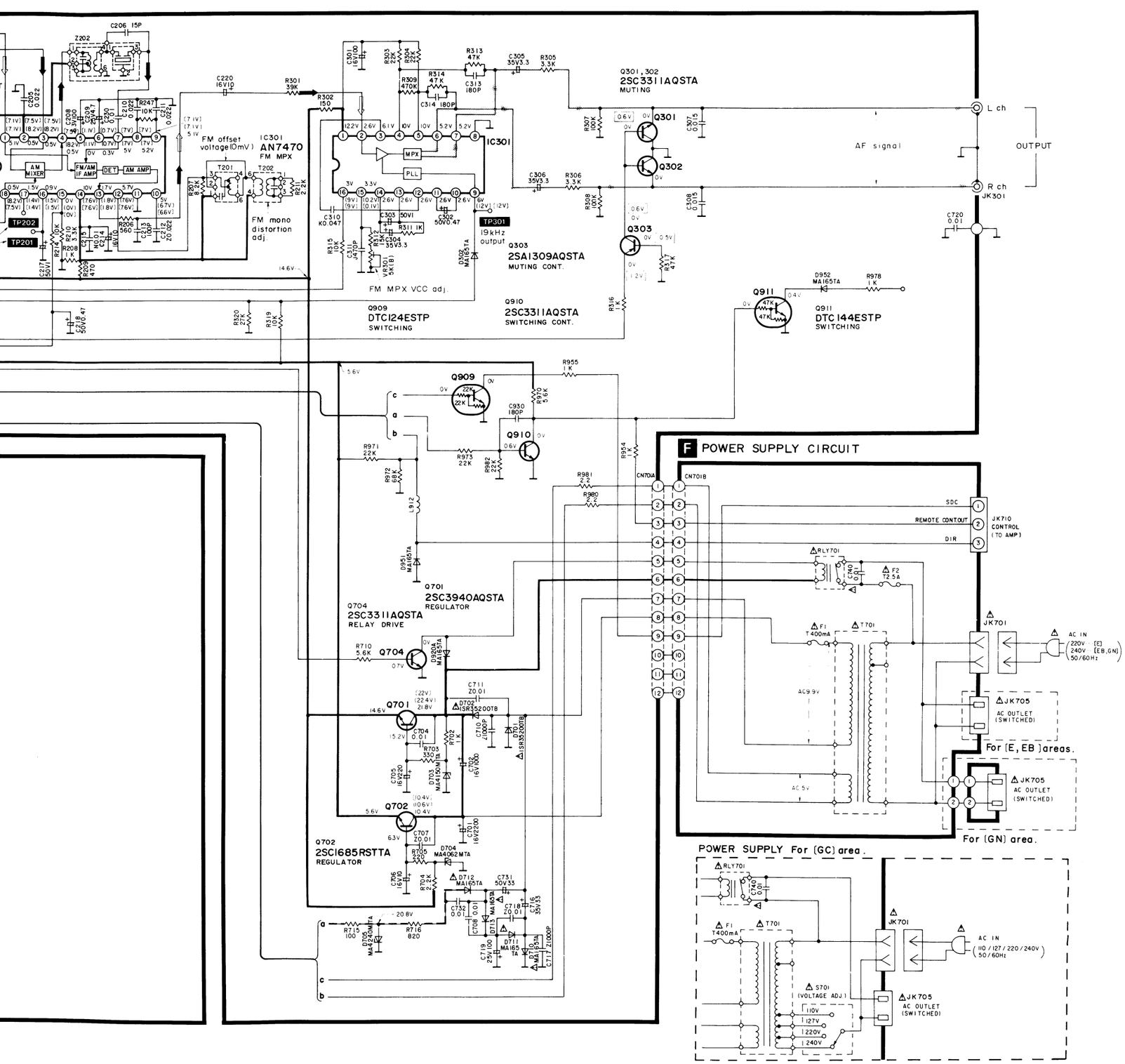
●ADJUSTMENT POINT





■ SCHEMATIC DIAGRAM (Parts list on pages 19~22.)





(This schematic diagram may be modified at any time with the development of new technology.)

Notes:

- **S701:** Voltage select switch in "240 V" position. (110 V↔127 V↔220 V↔240 V) for (GC) only
- **S913:** Band select (MW) switch.
- **S914:** Band select (LW) switch.
- **S915:** Memory switch.
- **S916:** Tuning mode select switch.
- **S917:** FM mode select switch.
- **S918:** Preset-channel (▲) switch.
- **S919:** Preset-channel (▼) switch.
- **S920:** Band select (FM) switch.
- **S921:** Power switch.
- **S922:** Sleep switch.
- **S923:** Cancel switch.
- **S924:** Stand-by switch.
- **S925:** Read switch.
- **S926:** Clock set switch.
- **S927:** Timer set switch.
- **S928:** Select (▼) switch.
- **S929:** Select (▲) switch.

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.
- ( ): MW voltage [ ]: LW voltage
- [ ]: muting voltage
- ——— Positive voltage lines (+)
- - - - - Negative voltage lines (−)
- **AF signal lines**
- **FM OSC**
- **AM OSC**
- **FM signal**
- **AM signal**
- Important safety notice
  Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.

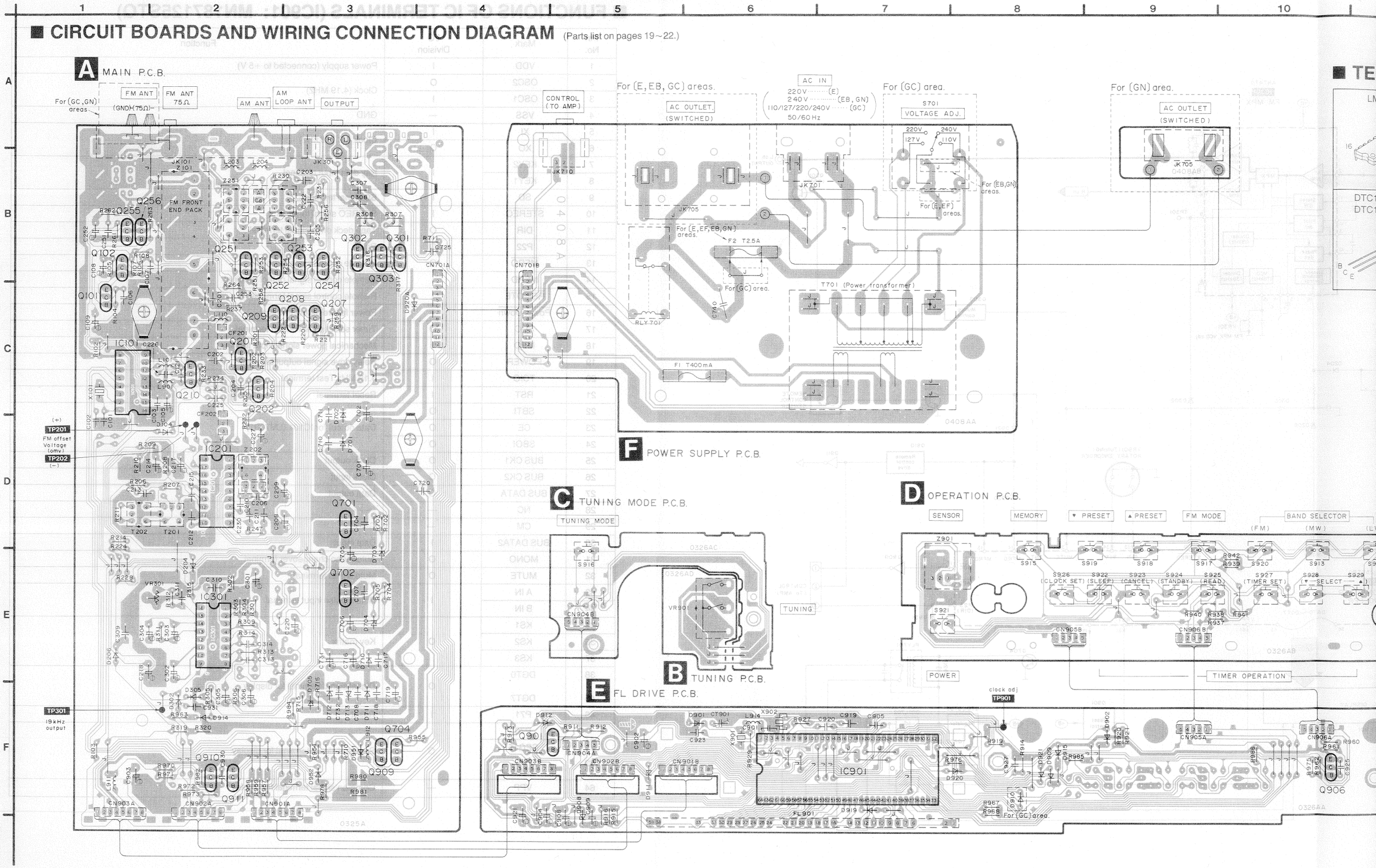
·Caution!

IC and LSI are sensitive to static electricity.
Secondary trouble can be prevented by taking care during repair.

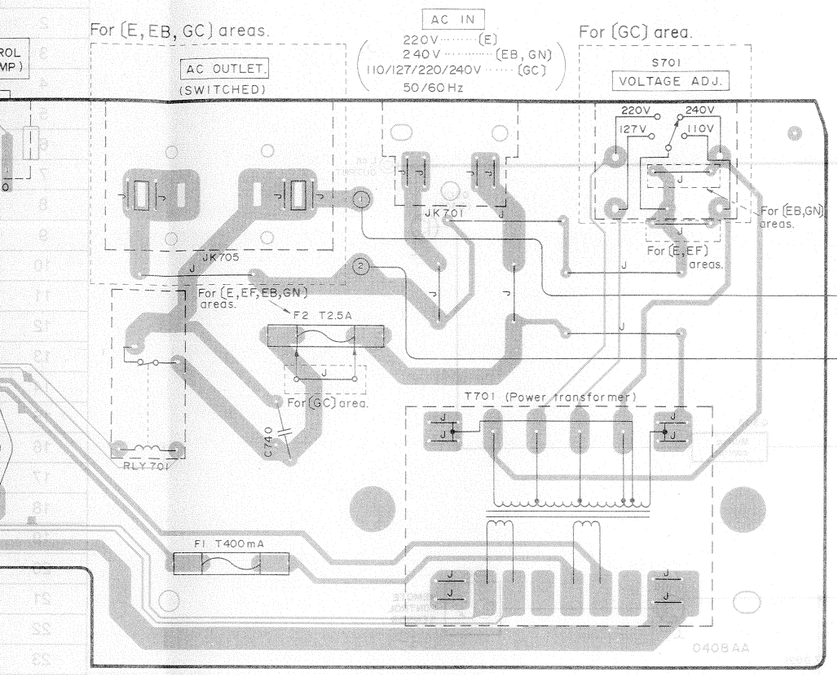
- Cover the parts boxes made of plastics with aluminum coil.
- Ground the soldering iron.
- Put a conductive mat on the work table.
- Do not touch the legs of IC or LSI with the fingers directly.

■ CIRCUIT BOARDS AND WIRING CONNECTION DIAGRAM

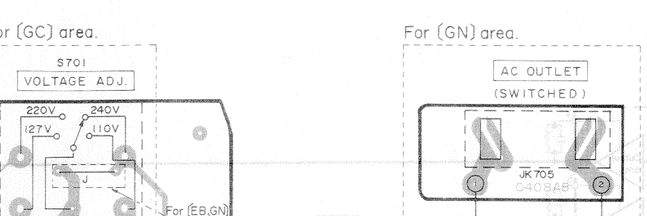
(Parts list on pages 19~22.)

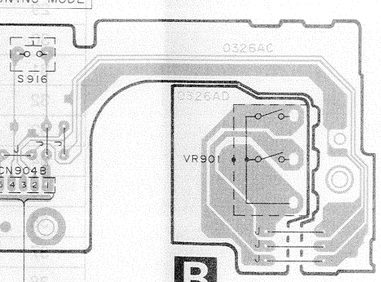


(Parts list on pages 19~22.)



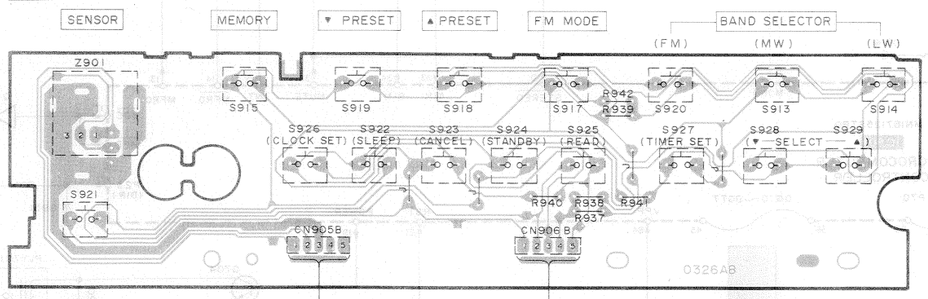
F POWER SUPPLY P.C.B.



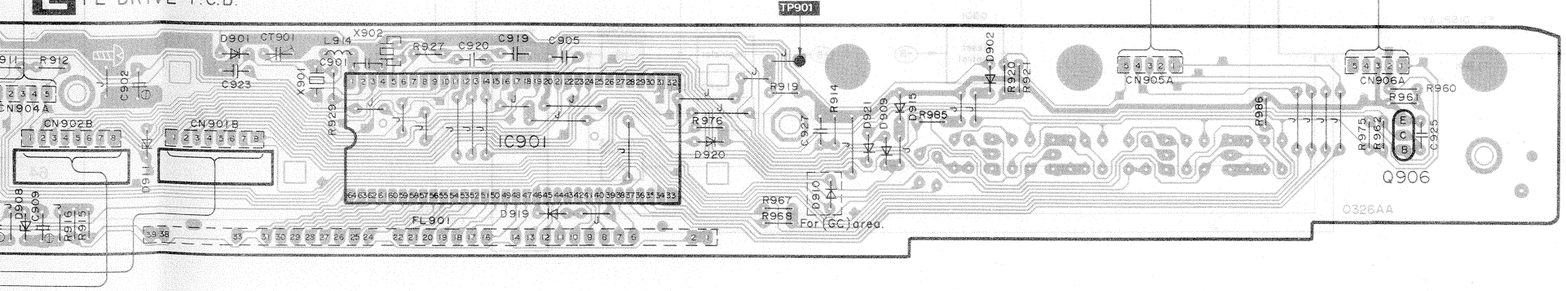


C TUNING MODE P.C.B.

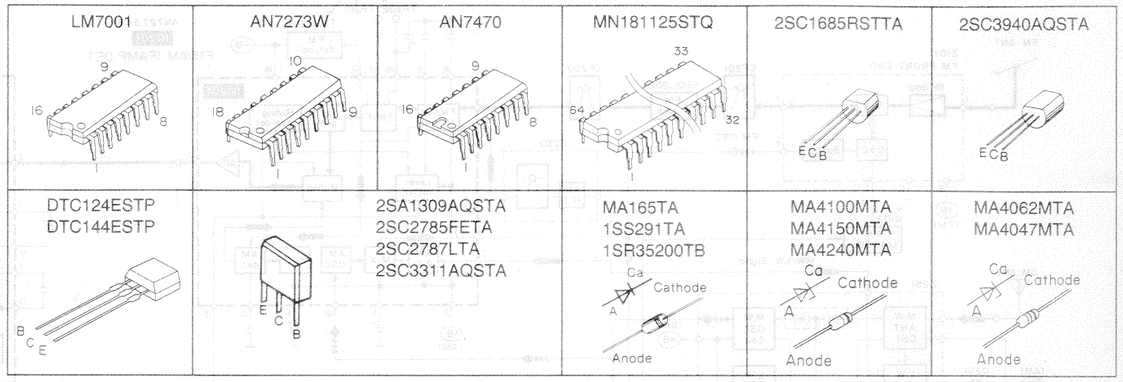
B TUNING P.C.B.



D OPERATION P.C.B.

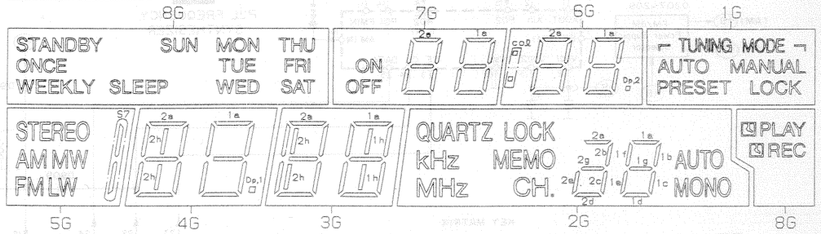


■ TERMINAL GUIDE OF IC'S, TRANSISTORS AND DIODES



■ DESCRIPTION OF FL PANEL

GRID ASSIGNMENT



ANODE CONNECTION

	8G	7G	6G	5G	4G	3G	2G	1G
S0	SLEEP	2d	2d	LW	2d	2d	CH.	LOCK
S1	-	2e	2e	FM	2e	2e	MHz	-
S2	WEEKLY	2c	2c	AM	2c	2c	kHz	MANUAL
S3	-	2g	2g	MW	2g	2g	2a,2d,2e,2g	-
S4	ONCE	2f	2f	-	2f	2f	MEMO	-
S5	-	2b	2b	-	2b	2b	AUTO	AUTO
S6	STANDBY	2a	2a	STEREO	2a	2a	QUARTZ LOCK	PRESET
S7	PLAY	ON	coℓ	/	2h	2h	2b	TUNING MODE
S8	WED	1d	1d	-	1d	1d	1d	-
S9	SAT	1e	1e	-	1e	1e	1e	-
S10	TUE	1c	1c	-	1c	1c	1c	-
S11	FRI	1g	1g	-	1g	1g	1g	-
S12	MON	1f	1f	-	1f	1f	1f	-
S13	THU	1b	1b	-	1b	1b	1b	-
S14	SUN	1a	1a	-	1a	1a	1a	-
S15	REC	OFF	DP,2	-	DP,1	1h	2c	-
S16	-	-	-	-	-	-	MONO	-

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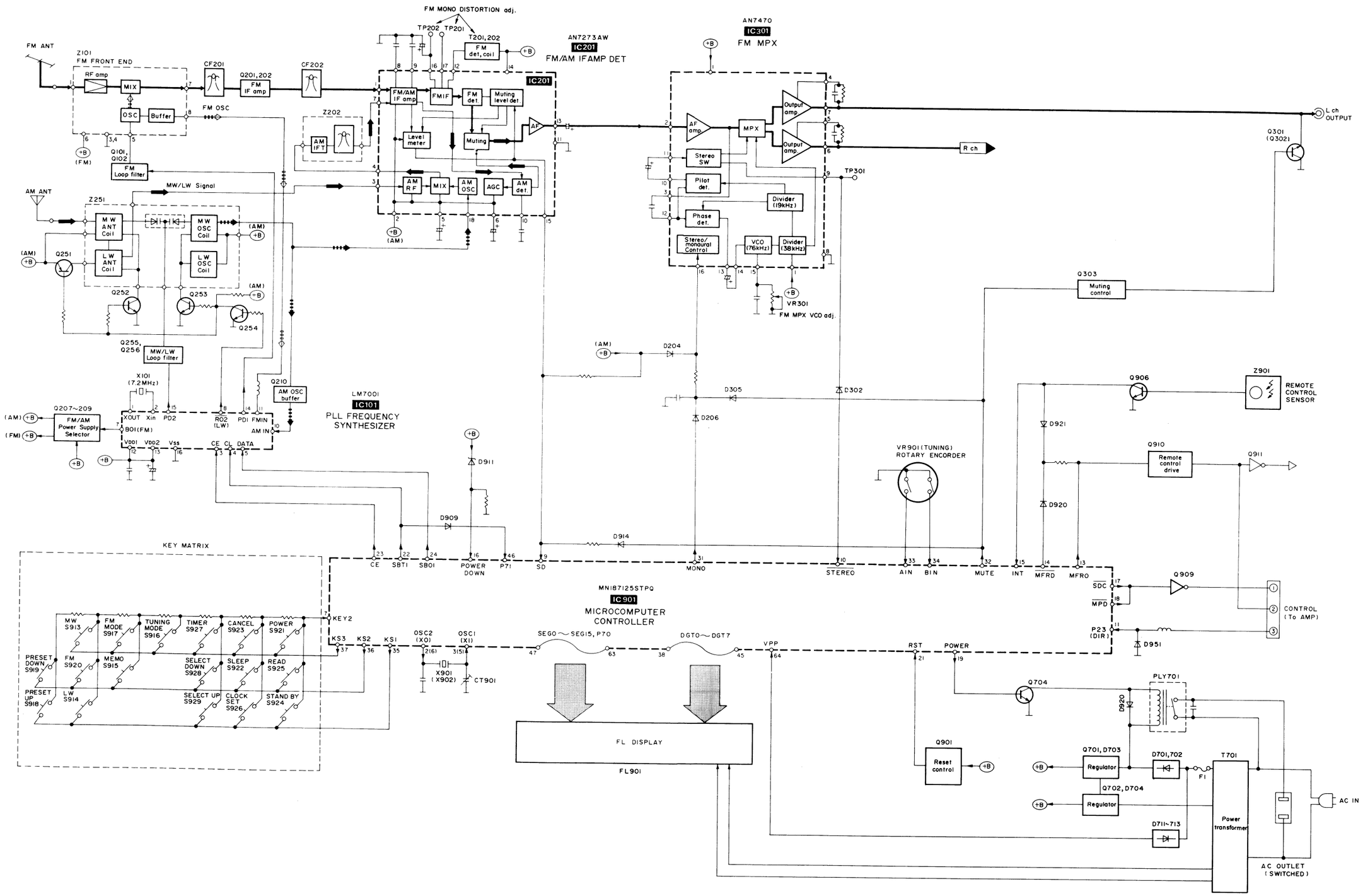
■ BLOCK DIAGRAM



■ FUNCTIONS OF IC TERMINALS (IC901: MN187125STQ)

Pin No.	Mark	I/O Division	Function
1	VDD	I	Power supply (connected to +5 V)
2	OSC2	O	Clock (4.19 MHz)
3	OSC1	I	
4	VSS	—	GND
5	XI	I	Clock (32.768 kHz)
6	XO	O	
7	KEY2	I	Key data input terminal
8	KEY1		
9	SD	I	SD signal terminal
10	$\overline{\text{STEREO}}$	I	$\overline{\text{STEREO}}$ signal terminal
11	DIR	O	Tape deck drive signal terminal
12	P22	O	Reset
13	$\overline{\text{MFRO}}$	O	Remote control signal terminal
14	MFRD	I	Remote control signal detect terminal
15	$\overline{\text{REMOTE}}$	I	Remote control signal terminal
16	$\overline{\text{Power Down}}$	I	Power failure detect terminal
17	SDC	O	Tuner select signal output terminal
18	MPD	I	Mechanical power signal input terminal
19	POWER	O	Relay drive signal output terminal
20	TCIO	I	4.19 MHz Test terminal
21	RST	I	Reset terminal
22	SBTI	O	Data output for IC101 (LM7001)
23	CE	O	
24	SBOI	O	
25	BUS CK1	O	Clock output
26	BUS CK2	O	Clock input
27	BUS DATA	O	Data output
28	NC	—	———
29	CM	—	GND
30	BUS DATA2	I	Data input
31	MONO	O	Auto/mono changeover terminal
32	MUTE	O	Mute signal terminal
33	A IN	I	Rotary pulse input terminal
34	B IN		
35	KS1	O	Key matrix
36	KS2		
37	KS3		
38	DGT0	O	Digital signal terminal for display
45	DGT7		
46	P71	I	Reset
47	P70	O	Segment signal terminal for display
	SEG15		
63	SEG0		
64	VPP	—	Common signal terminal for display

■ REPLACEMENT PARTS LIST

Notes : * Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components use only manufacturer's specified parts.
* The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.) Parts without these indications can be used for all areas.
* Remote Control Ass'y:
Supply period for three years from termination of production.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC101	LM7001	I. C, PLL	
IC201	AN7273W	I., FM/AM IF AMP, DET	
IC301	AN7470	I. C, FM MPX	
IC901	MN187125STQ	I. C, CONTROLLER	
		TRANSISTOR(S)	
Q101, 102	2SC2785FETA	TRANSISTOR	
Q201, 202	2SC2787LTA	TRANSISTOR	
Q207	2SC3311AQSTA	TRANSISTOR	
Q208, 209	2SA1309AQSTA	TRANSISTOR	
Q210	2SC3311AQSTA	TRANSISTOR	
Q251	2SA1309AQSTA	TRANSISTOR	
Q252-254	2SC3311AQSTA	TRANSISTOR	
Q255, 256	2SC2785FETA	TRANSISTOR	
Q301, 302	2SC3311AQSTA	TRANSISTOR	
Q303	2SA1309AQSTA	TRANSISTOR	
Q701	2SC3940AQSTA	TRANSISTOR	
Q702	2SC1685RSTTA	TRANSISTOR	
Q704	2SC3311AQSTA	TRANSISTOR	
Q901	2SC3311AQSTA	TRANSISTOR	
Q906	2SC3311AQSTA	TRANSISTOR	
Q909	DTC124ESTP	TRANSISTOR	
Q910	2SC3311AQSTA	TRANSISTOR	
Q911	DTC144ESTP	TRANSISTOR	
		DIODE(S)	
D104	MA165TA	DIODE	
D204	MA165TA	DIODE	
D206	MA165TA	DIODE	
D302	MA165TA	DIODE	
D305	MA165TA	DIODE	
D701, 702	1SR35200TB	DIODE	
D703	MA4150MTA	DIODE	
D704	MA4062MTA	DIODE	
D705	MA4240MTA	DIODE	
D710-713	MA165TA	DIODE	⚠
D901	1SS291TA	DIODE	
D902	MA165TA	DIODE	
D908	MA4047MTA	DIODE	
D909	MA165TA	DIODE	
D910	MA165TA	DIODE	(GC)

Ref. No.	Part No.	Part Name & Description	Remarks
D911	MA4100MTA	DIODE	
D912	MA165TA	DIODE	
D914	1SS291TA	DIODE	
D915	MA165TA	DIODE	
D919	MA165TA	DIODE	
D920	MA165TA	DIODE	
D920A	MA165TA	DIODE	
D921	MA165TA	DIODE	
D951, 952	MA165TA	DIODE	
		VARIABLE RESISTOR(S)	
VR301	EVNDXAA00B53	V. R, FM MPX VCO ADJ.	
VR901	EVQWX902612B	V. R, ROTARY ENCORDER	
		COMPONENT COMBINATION(S)	
Z101	RAL0006	COMPONENT COMBINATION	
Z202	RLI2Z003M-T	COMPONENT COMBINATION	
Z251	RLA6Z001-T	COMPONENT COMBINATION	
Z901	RCD0001-1	COMPONENT COMBINATION	
		COIL(S)	
L101	RLQZP1R0KT-Y	COIL	
L110	RLQZPR22KT-Y	COIL	
L203, 204	ELEPKR22MA	COIL	
L901	RLQZP101KT-Y	COIL	
L911, 912	RLQZP1R0KT-Y	COIL	
L914	ELEXT101KA9	COIL	
		TRANSFORMER(S)	
T201	RLI4B002-Z	TRANSFORMER	
T202	RLI4B003-Z	TRANSFORMER	
T701	RTP1K4E011	POWER TRANSFORMER	⚠(E) (EB) (GN)
T701	RTP1K4E012	POWER TRANSFORMER	⚠(GC)
		FILTER(S)	
CF201, 202	RLFFETWNA01L	CERAMIC FILTER	
		OSCILLATOR(S)	
X101	SVQ49U722T-S	OSCILLATOR	
X901	SVQ49U422T-S	OSCILLATOR	

Ref. No.	Part No.	Part Name & Description	Remarks
X902	RSXB32K7S01	OSCILLATOR	
		DISPLAY TUBE	
FL901	RSL0056-F	DISPLAY TUBE	
		SWITCH(ES)	
S701	SSR187-1	SW, VOLTAGE SELECTOR	⚠(GC)
S913	EVQ21405R	SW	
		CONNECTOR(S)	
CN901A	RJU003K008M1	SOCKET(8P)	
CN902A	RJU003K008M1	SOCKET(8P)	
CN903A	RJU003K008M1	SOCKET(8P)	
CN904A	SJT30548BB1	CONNECTOR(5P)	
CN905A	SJT30548BB1	CONNECTOR(5P)	
CN906A	SJT30548BB1	CONNECTOR(5P)	
CN701B	RJT005W012	CONNECTOR(12P)	
CN701A	RJU005W012	SOCKET(12P)	
CN901B	RJT003K008M1	CONNECTOR(8P)	
CN902B	RJT003K008M1	CONNECTOR(8P)	
CN903B	RJT003K008M1	CONNECTOR(8P)	
CN904B	SJS50581BB	SOCKET(5P)	
CN905B	SJS50581BB	SOCKET(5P)	
CN906B	SJS50581BB	SOCKET(5P)	
		VARIABLE CAPACITOR(S)	
CT901	ECRLB010A12	VARIABLE CAPACITOR	
		FUSE HOLDER(S)	
FC701	EYF52BC	FUSE HOLDER	
FC702	EYF52BC	FUSE HOLDER	
FC703	EYF52BC	FUSE HOLDER	(E) (EB) (GN)
FC704	EYF52BC	FUSE HOLDER	(E) (EB) (GN)
		RELAY(S)	
RLY701	RSY0003	RELAY	⚠
		JACKS	
JK101	RJH4202	ANTENNA	(E) (EB)
JK101	RJH4405-1	ANTENNA	(GC) (GN)
JK301	SJF3068N	LINE OUT	
JK701	SJS9236	AC INLET	⚠(E) (EB) (GC)
JK701	SJSD16	AC INLET	⚠(GN)
JK705	RJS1A4902-B	AC OUTLET	⚠(E)
JK705	RJS1A4802-B	AC OUTLET	⚠(EB)

Ref. No.	Part No.	Part Name & Description	Remarks
JK705	RJS1A4602	AC OUTLET	⚠(GN)
JK705	SJS9331B	AC OUTLET	⚠(GC)
JK710	RJS1A0203-0	CONTROL(TO AMP.)	
		FUSE(S)	
F1	XBA2C04TB0	FUSE 250V 0.4A	⚠
F2	XBA2C25TB0	FUSE 250V 2.5A	⚠(E) (EB) (GN)

Notes : • Capacity valuse are in microfarads (uF) unless specified otherwise, P=Pico-farads(pF) F=Farads(F)
• Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks
R102, 103	ERDS2TJ103T	1/4W 10K
R104	ERDS2TJ102T	1/4W 1K
R105	ERDS2TJ561T	1/4W 560
R106	ERDS2TJ562T	1/4W 5.6K
R107	ERDS2TJ103T	1/4W 10K
R108	ERDS2TJ391T	1/4W 390
R201	ERDS2TJ102T	1/4W 1K
R202	ERDS2TJ824T	1/4W 820K
R203	ERDS2TJ331T	1/4W 330
R204	ERDS2TJ474T	1/4W 470K
R205	ERDS2TJ331T	1/4W 330
R206	ERDS2TJ561T	1/4W 560
R207	ERDS2TJ822T	1/4W 8.2K
R208	ERDS2TJ102T	1/4W 1K
R209	ERDS2TJ471T	1/4W 470
R210	ERDS2TJ332T	1/4W 3.3K
R211	ERDS2TJ222T	1/4W 2.2K
R214	ERDS2TJ103T	1/4W 10K
R220	ERDS2TJ103T	1/4W 10K
R221	ERDS2TJ104T	1/4W 100K
R222	ERDS2TJ473T	1/4W 47K
R224	ERDS2TJ824T	1/4W 820K
R228	ERDS2TJ102T	1/4W 1K
R230	ERDS2TJ104T	1/4W 100K
R231	ERDS2TJ102T	1/4W 1K
R232	ERDS2TJ122T	1/4W 1.2K
R233	ERDS2TJ684T	1/4W 680K
R234	ERDS2TJ103T	1/4W 10K
R237	ERDS2TJ151T	1/4W 150
R247	ERDS2TJ103T	1/4W 10K
R251	ERDS2TJ103T	1/4W 10K
R252	ERDS2TJ822T	1/4W 8.2K
R253	ERDS2TJ182T	1/4W 1.8K
R254	ERDS2TJ223T	1/4W 22K
R256	ERDS2TJ102T	1/4W 1K
R258, 259	ERDS2TJ122T	1/4W 1.2K
R261	ERDS2TJ102T	1/4W 1K
R262	ERDS2TJ332T	1/4W 3.3K
R263	ERDS2TJ153T	1/4W 15K
R264	ERDS2TJ102T	1/4W 1K
R301	ERDS2TJ393T	1/4W 39K
R302	ERDS2TJ151T	1/4W 150
R303, 304	ERDS2TJ223T	1/4W 22K
R305, 306	ERDS2TJ332T	1/4W 3.3K
R307, 308	ERDS2TJ104T	1/4W 100K
R309	ERDS2TJ474T	1/4W 470K
R311	ERDS2TJ102T	1/4W 1K
R312	ERDS2TJ153T	1/4W 15K
R313, 314	ERDS2TJ473T	1/4W 47K

Ref. No.	Part No.	Values & Remarks
R315	ERDS2TJ103T	1/4W 10K
R316	ERDS2TJ102T	1/4W 1K
R317	ERDS2TJ473T	1/4W 47K
R319	ERDS2TJ103T	1/4W 10K
R320	ERDS2TJ273T	1/4W 27K
R702	ERDS2TJ102T	1/4W 1K
R703	ERDS2TJ331T	1/4W 330
R704	ERDS2TJ222T	1/4W 2.2K
R705	ERDS2TJ221T	1/4W 220
R710	ERDS2TJ562T	1/4W 5.6K
R711	ERDS2TJ100T	1/4W 10
R715	ERDS2TJ101T	1/4W 100
R716	ERDS2TJ821T	1/4W 820
R911	ERDS2TJ823T	1/4W 82K
R912	ERDS2TJ183T	1/4W 18K
R913	ERDS2TJ224T	1/4W 220K
R914	ERDS2TJ333T	1/4W 33K
R915, 916	ERDS2TJ101T	1/4W 100
R919	ERDS2TJ103T	1/4W 10K
R920	ERDS2TJ102T	1/4W 1K
R921	ERDS2TJ103T	1/4W 10K
R927	ERDS2TJ224T	1/4W 220K
R929	ERDS2TJ152T	1/4W 1.5K
R937	ERDS2TJ392T	1/4W 3.9K
R938	ERDS2TJ562T	1/4W 5.6K
R939	ERDS2TJ123T	1/4W 12K
R940	ERDS2TJ182T	1/4W 1.8K
R941	ERDS2TJ222T	1/4W 2.2K
R942	ERDS2TJ273T	1/4W 27K
R954, 955	ERDS2TJ102T	1/4W 1K
R957-959	ERDS2TJ222T	1/4W 2.2K
R960, 961	ERDS2TJ104T	1/4W 100K
R962	ERDS2TJ682T	1/4W 6.8K
R963	ERDS2TJ274T	1/4W 270K
R967, 968	ERDS2TJ104T	1/4W 100K
R970	ERDS2TJ562T	1/4W 5.6K
R971	ERDS2TJ223T	1/4W 22K
R972	ERDS2TJ683T	1/4W 68K
R973	ERDS2TJ223T	1/4W 22K
R975	ERDS2TJ473T	1/4W 47K
R976	ERDS2TJ103T	1/4W 10K
R978	ERDS2TJ102T	1/4W 1K
R980, 981	ERDS2TJ2R2T	1/4W 2.2
R982	ERDS2TJ223T	1/4W 22K
R984	ERDS2TJ471T	1/4W 470
R985, 986	ERDS2TJ223T	1/4W 22K
		CAPACITORS

Ref. No.	Part No.	Values & Remarks
C101, 102	ECBT1H150JC5	50V 15P
C103	ECBT1H102KB5	50V 1000P
C105	ECEA0JU101B	6.3V 100U
C106, 107	ECBT1C103NS5	16V 0.01U
C108	ECEA25M4R7RB	25V 4.7U
C109	ECEA1CU330B	16V 33U
C121	ECBT1H102KB5	50V 1000P
C201, 202	ECBT1C103NS5	16V 0.01U
C203	ECBT1H8R2KC5	50V 8.2P
C204	ECBT1H102KB5	50V 1000P
C205	ECKR1H223ZF5	50V 0.022U
C206	ECBT1H150JC5	50V 15P
C208	ECEA0JU101B	6.3V 100U
C209	ECEA1EK4R7B	25V 4.7U
C210, 211	ECKR1H223ZF5	50V 0.022U
C212	ECBT1E223ZF5	25V 0.022U
C213	ECBT1H101KB5	50V 100P
C214	ECEA1CK100B	16V 10U
C215	ECBT1C103NS5	16V 0.01U
C217	ECEA1HK010B	50V 1U
C218	ECEA1HKR47B	50V 0.47U
C220	ECEA1CK100B	16V 10U
C222	ECFR1E473KR	25V 0.047U
C225	ECBT1H180JC5	50V 18P
C226	ECBT1C103NS5	16V 0.01U
C227	ECEA1CK100B	16V 10U
C230	ECBT1C103NS5	16V 0.01U
C251	ECBT1E223ZF5	25V 0.022U
C252	ECEA1HK010B	50V 1U
C253	ECBT1E223ZF5	25V 0.022U
C301	ECEA1CU101B	16V 100U
C302	ECEA1HKR47B	50V 0.47U
C303	ECEA1HK010B	50V 1U
C304-306	ECEA1VK3R3B	35V 3.3U
C307, 308	ECFR1E153KR	25V 0.015U
C309	ECKR1H103ZF5	50V 0.01U
C310	ECFR1E473KR	25V 0.047U
C311	ECQP1471JZ3	50V 470P
C313, 314	ECBT1H181KB5	50V 180P
C701	ECEA1CU222YB	16V 2200P
C702	ECEA1CU102B	16V 0.01U
C704	ECKR1H103ZF5	50V 0.01U
C705	ECEA1CU221B	16V 220U
C706	ECEA1CK100B	16V 10U
C707, 708	ECKR1H103ZF5	50V 0.01U
C710	ECKR2H102ZF5	100V 1000P
C711	ECKR1H103ZF5	50V 0.01U
C716	ECEA1VU330B	35V 33U
C717	ECKR2H102ZF5	100V 1000P

Ref. No.	Part No.	Values & Remarks
C718	ECKR1H103ZF5	50V 0.01U
C719	ECEA1EU101B	25V 100U
C720	ECKR1H103ZF5	50V 0.01U
C725	ECKR1H103ZF5	50V 0.01U
C731	ECEA1HU330B	50V 33U
C732	ECKR1H103ZF5	50V 0.01U
C740⚠	ECKWKC103PF2	400V 0.01U
C901	ECBT1H104ZF5	50V 0.1U
C902, 903	ECEA0JU102B	6.3V 1000U
C904	ECEA1CU470B	16V 47U
C905	ECBT1C103NS5	16V 0.01U
C908, 909	ECEA1VU330B	35V 33U
C919	ECBT1H220JJ5	50V 22P
C920	ECBT1H180JJ5	50V 18P
C921	ECEA1EK4R7B	25V 4.7U
C923	ECBT1H8R2KC5	50V 8.2P
C925	ECBT1H102KB5	50V 1000P
C927	ECBT1H102KB5	50V 1000P
C930	ECBT1H181KB5	50V 180P
C931	ECBT1H102KB5	50V 1000P

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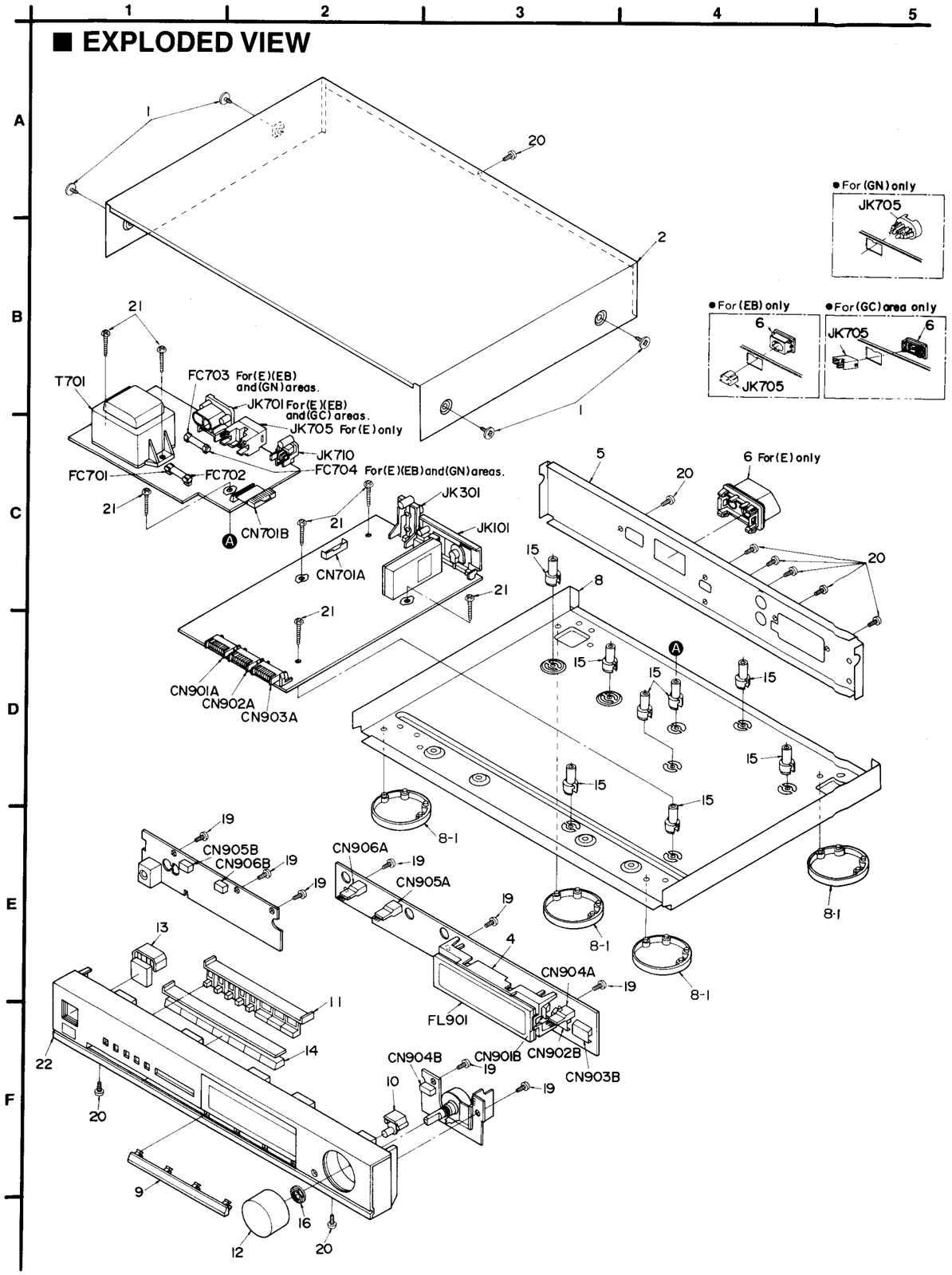
Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RHD30007	SCREW	
2	RKM0055-1K	CABINET	
4	RMN0076	FL HOLDER	
5	RGR0086A-E	REAR PANEL	(E)
5	RGR0086B-B	REAR PANEL	(EB)
5	RGR0086C-B	REAR PANEL	(GC)
5	RGR0086D-B	REAR PANEL	(GN)
6	RJS1A4902-A	AC CUTLET COVER	⚠(E)
6	RJS1A4802-A	AC OUTLET COVER	⚠(EB)
6	SJS9331A	AC OUTLET COVER	⚠(GC)
8	RFKJTX901LEK	BOTTOM BOARD ASS'Y	
8-1	RKA0011	FOOT	
9	RGK0253	ORNAMENT	
10	RGU0381	BUTTON	
11	RGU0382	BUTTON	
12	RGW0077	KNOB	
13	SBC986-2	BUTTON	
14	SBC987-2A	BUTTON	
15	SHE187-2	HOLDER	
16	SNE4021	NUT	
19	XTBS26+8J	SCREW	
20	XTBS3+8JFZ1	SCREW	
21	XTB3+20JFZ	SCREW	
22	RFKGTX301LEK	FRONT PANEL ASS'Y	
		PACKING MATERIAL	
P1	RPG0455	PACKING CASE	
P2	RPN0329	PAD	
P3	SPSD152	ACCESSORIES BOX	
P4	XZB52X60A01Z	PROTECTION COVER	

Ref. No.	Part No.	Part Name & Description	Remarks
		ACCESSORIES	
A1	RAK-SC301X	REMOTE CONTROLLER	
A1-1	RKK0008	BATTERY COVER, REMOTE CONT.	
A2	SQX7186	WARRANTY CARD	(GN)
A2	RQA0013	WARRANTY CARD	(E) (EB)
A3	RQCB0169	SERVICE CENTER LIST	
A4	RFKSTX301LEK	INSTRUCTIONS MANUAL	(E)
A4	RQT0493-G	INSTRUCTIONS MANUAL	(GC)
A4	RQT0492-B	INSTRUCTIONS MANUAL	(EB) (GN)
A5	SQX40014	AM INSTRUCTIONS	(GC)
A5	SQX40022	AM INSTRUCTIONS	(GN)
A6	SJA193	POWER CORD	⚠(EB)
A6	RJA0004	POWER CORD	⚠(GC)
A6	SJA173	POWER CORD	⚠(GN)
A6	SFDAC05E03	POWER CORD	⚠(E)
A7	SJPK2203-2	STEREO PIN CORD	
A8	SPB1162T	AM LOOP ANTENNA	
A8-1	SMA233-1M	HOLDER	
A8-2	SMA231M	HOLDER	
A8-3	XTB3+10AFZ	SCREW	
A9	SSA272M	FM ANTENNA	(GC) (GN)
A9	SSA270M	FM ANTENNA	(E) (EB)
A10	SWKTX930E	LEAD WIRE	
A11	SJP9009	ATTACHMENT PLUG	⚠(EB)
A12	SJP9215	AC PLUG ADAPTOR	⚠(GC)

■ EXPLODED VIEW



Printed in Japan
F900X0 7200HS/KH

DEUTSCH

Tuner

ST-X301L

■ MESSUNGEN UND JUSTIERUNGEN

UKW JUSTIERUNGEN

Einstellungen der Bedienelemente und zu verwendende Geräte.

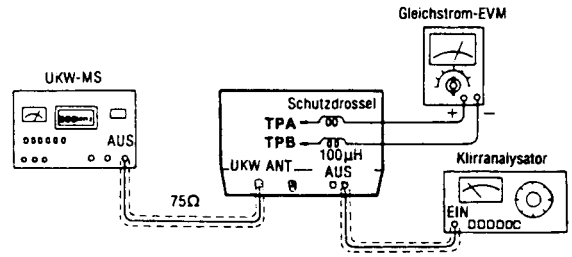
- UKW-Messender(UKW-MS)
- Stereo-Modulator
- Verzerrungs-Analystator
- Elektronische Gleichstrom-Voltmeter(EVM)
- Frequenzzähler
- Drosselspule(100μH)
- Widerstand(100kΩ)

Anmerkung: Für Z202 und Z251 werden bereits justierte Ersatzteile geliefert. Die Kerne dieser Teile daher nicht drehen.

UKW-MONO-VERZERRUNGS-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Stellen Sie die Einheit auf **"FM(UKW)"** Betrieb.
3. Die Radiofrequenzanzeige und den Messender auf **100.10MHz** einstellen.
4. Den Kern von **T201** so justieren, daß die im Signalzustand gemessene Spannung **0mV (0±20mV)** im 300mV-Bereich beträgt.
5. **T202** so justieren, daß der Verzerrungsfaktor des linken Kanals minimal wird.
6. Schritte 4 und 5 einige Male wiederholen.

ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 1kHz
Ausgangspegel 66dB

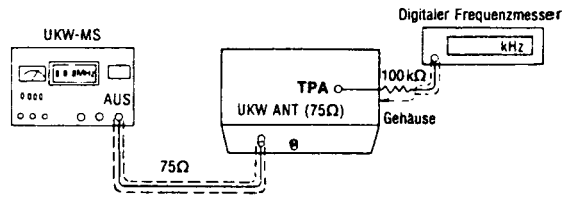


TPA = TP201 , TPB = TP202

Anmerkung:
Für die Justierung ist ein Schraubendreher aus Kunststoff zu verwenden.

MPX-SGO-JUSTIERUNG

1. Der Testaufbau ist in der Abbildung gezeigt.
2. Den UKW-Bertriebsart-Wahlshalter in die **"on/auto"**-Position stellen.
3. Radio und Meßsender auf **100.10MHz** einstellen.
4. **VR301** auf **19kHz ± 30Hz** auf der Frequenzzähleranzeige justieren.

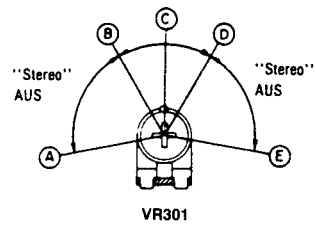


TPA = TP301

● VERWENDUNG EINES ALTERNATIVSYSTEMS

1. Stereosignal vom Meßsender eingeben oder eine Stereo-Sendung empfangen.
2. **VR301** justieren, bis die Stereo-Anzeige aufleuchtet. Den Arm von **VR301** mit Lack sichern, wie in der Abbildung gezeigt.

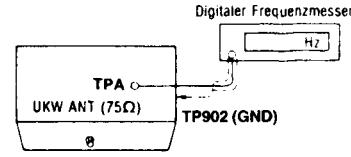
ZUSTAND DES UKW-MESSENDERS
Modulation 100%
Modulationsfrequenz 0kHz
Ausgangspegel.....66dB



Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... "Stereo" AUS Stellung
Ⓑ–Ⓓ..... "Stereo" EIN Stellung (Anzeigebeleuchtung)
Ⓒ..... Einstellpunkt des pilotschaltkreis'

ELNSTELLUNG DER PHASENSPERRUNG EINES SCHLEIFENVERSCHIUSSES

1.Der Testaufbau ist in der Abbildung gezeigt.
2.Die Netzschalter auf OFF stellen. (Die Anzeige "**E**" blinkt.)
3.**CT901** auf **2,097,152Hz±10Hz** auf der Frequenzzähleranzeige justieren.



TPA = TP901

FRANÇAIS

■ MEAURAGES ET REGLAGES

M.F. REGLAGES

Positionnements des commandes et équipement utilisé

- Générateur de signaux M.F.(FG-SG)
- Modulateur stéréophonique
- Analyseur de distorsion
- Voltmètre électronique à C.C. (EVM).
- Compteur de fréquence
- Bobine d'amortissement d'arrêt (100μH)
- Résistance (100KΩ)

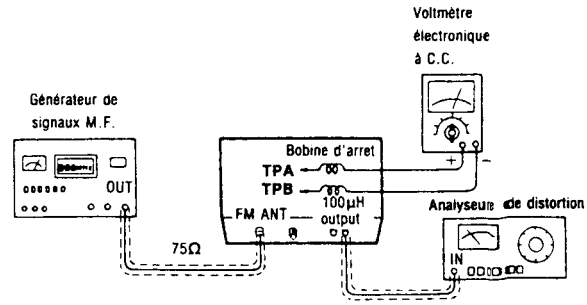
Nota: Pour Z202 et Z251, ajuster les éléments qui sont fournis. Aussi, ne pas tourner les noyaux de ces éléments.

REGLAGE DE DISTORSION MONOPHONIQUE M.F.

1.Le raccordement de l'équipement d'essai est montré sur l'illustration.
2.Régler l'appareil sur le mode "**FM**".
3.Ajuster le réglage de l'affichage de radiofréquence et du générateur de signaux sur **100.10MHz**.
4.Régler le noyau de **T201** de telle sorte que la tension mesurée sur le mode de signaux soit de **0mV (0mV ± 20mV)** dans une plage de 300mV.
5.Ajuster **T202** de telle que le facteur de sistorsion du canal de gauche soit minimisé.
6.Répéter les étapes 4 et 5 quelques fois.

Nota: Le tournevis de réglage utilisé devra ètre fait en résines.

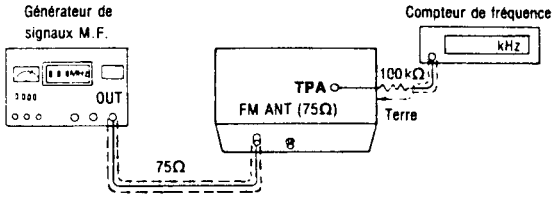
CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation 100%
Fréquenz de modulation 1kHz
Niveau de sortie.....66dB



TPA = TP201 , TPB = TP202

REGLAGE MULTIPLEX DE L'OSCILLATEUR COMMANDE PAR VARIATION DE TENSION

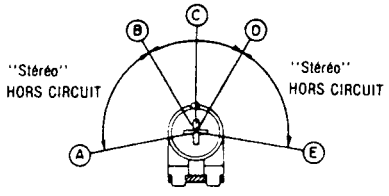
1.Le raccordement de l'équipement d'essai est montré sur la figure.
2.Régler l'appareil sur la position **"on/auto"**.
3.Régler le cadran radio et le générateur de signaux sur **100.10MHz.**
4.Ajuster **VR301** pour **19kHz ± 30Hz** sur le compteur de lecture de fréquences.



TPA = TP301

- **EN UTILISANT UN SYSTEME ALTERNATIF**

1.Applique un signal stéréo à partir du générateur ou recevoir une émission stéréo.
2.Ajuster **VR301** jusqu' à ce que l'indicateur stéréo s éclaire. Coller le bras de **VR301** comme il montré sur la figure.



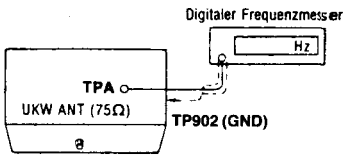
VR301

CONDITION DU GENERATEUR DE SIGNAUX M.F.
Modulation 100%
Fréquenz de modulation 0kHz
Niveau de sortie.....66dB

Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... Position de HORS CIRCUIT "Stereo".
Ⓑ–Ⓓ..... Position de MISE EN CIRCUIT "Stereo". (Eciairage de l'indicateur)
Ⓒ..... Point de réglage du circuit pilote.

REGLAGE DE L'HORLOGE EN BOUCLE À BLOCAGE DE PHASE

1.Le raccordement de l'équipement d'essai est montré sur la figure.
2.Placer l'interrupteur d'alimentation sur OFF. (L'indication **"E"** clignote sur l'affichage.)
3.Ajuster **CT901** pour **2,097,152Hz±10Hz** sur le compteur de lecture de fréquences.



TPA = TP901

ESPAÑOL

■ MEDICIONES Y AJUSTES

FM AJUSTES

Posiciones de control y equipo usado

- Generador de señales de FM(FM-SG)
- Modulador estéreo
- Analizador de distorsiones
- Voltímetro electrónico de CC(EVM)
- Frecuencímetro
- Bobina de choque(100μH)
- Resistor(100kΩ)

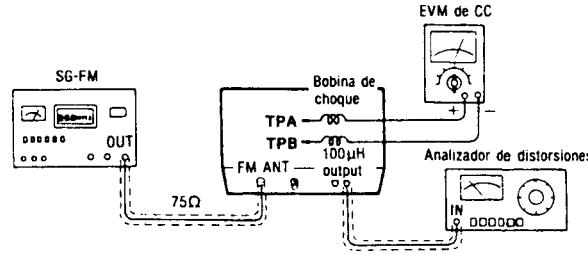
Nota: Para Z202, Z251, L321 y L322 , se suministran piezas ajustadas. Por lo tanto, no cambie los núcleos de estas piezas.

AJUSTE DE DISTORSION MONO FM

1.La conexión del equipo de pruebas se muestra en la figura.
2.Poner la unidad en modalidad de **"FM".**
3.Poner la puesta de la presentación de radiofrecuencia y generador de señales a **100,10MHz.**
4.Ajustar el núcleo de **T201** de manera que el voltaje medido en modalidad de señal sea **0mV (0±20mV).**
5.Ajustar **T202** de manera que el factor de distorsión de CH-I se minimice.
6.Repetir los pasos 4 y 5 algunas veces.
7.Asegurarse de que los factores de distorsión de CH-I y CH-D sean casi los mismos y los mínimos.

Nota:
El destornillador de ajuste usado debe estar hecho de resina.

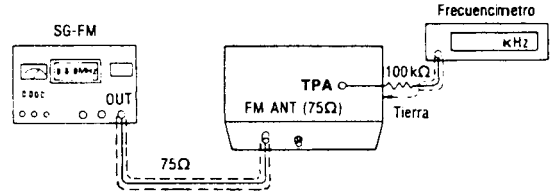
CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 100%
Frecuencia de modulación 1kHz
Nivel de salida 66dB



TPA = TP201 , TPB = TP202

AJUSTE DE MPX VCO(OSCILADOR CONTROLADO POR VOLTAJE MPX)

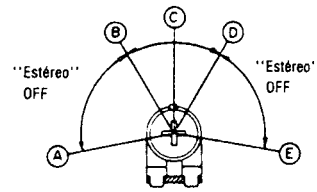
1.La conexión del equipo de pruebas se muestra en la figura.
2.Poner la unidad en la posición de **"on/auto".**
3.Poner la presentación de la radio y la puesta del generador de señales en **100.10MHz.**
4.Ajustar **VR301** para **19kHz±30Hz** en lectura de frecuencímetro.



TPA = TP301

* USANDO SISTEMA ALTERNATIVO

1.Aplicar señal estereofónica del generador o recibir la emisión estereofónica.
2.Ajustar **VR301** hasta que la presentacón de estéro se encienda. Fijar el brazo de **VR301** como se muestra en la figura.



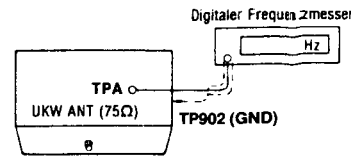
VR301

CONDICION DE GENERADOR DE SEÑALES DE FM
Modulación 100%
Frecuencia de modulación 0kHz
Nivel de salida 66dB

Ⓐ–Ⓑ,
Ⓓ–Ⓔ..... Pósición de "estéreo" OFF.
Ⓑ–Ⓓ..... Pósición de "estéreo" ON. (indicador encendido)
Ⓒ..... Punto de ajuste de circuito piloto.

AJUSTE DEL RELOJ DEL ENLACE DE LA FASE DE CIERRE(PHASE-LOCKED LOOP)

1.La conexión del equipo de pruebas se muestra en la figura.
2.Colocar el conmutador de alimentación en OFF (apagado). (La indicación **"E"** destellará.)
3.Ajustar **CT901** para **2,097,152Hz±10Hz** en lectura de frecuencímetro.



TPA = TP901

Printed in Japan
F900304 00 HS/KH/YY